Poverty of the Stimulus: Part 1, Chomsky 1959

Commenter Raymondw provided a reading list for behaviorist rebuttals to Noam Chomsky’s poverty of the stimulus argument. (They are here) It is a valuable list and I hope blog visitors will
check it out. This week I’m going to make several posts surveying the “poverty of the stimulus” question and at the end the commenter will provide his reaction to my pontificating.

The Chomskyan revolution is commonly dated to publication of his *Syntactic Structures* (1957) but I date it a little later, to the 1959 publication of his review of B.F. Skinner’s book *Verbal Behavior*. (review [here](#)) In the 1950s Skinner was considered America’s most important psychologist. He did extensive experimental work with pigeons, training them to do many things using a method called operant conditioning, and he showed beyond the shadow of a doubt that animals could be trained to behave in many surprising ways if the behavior was rewarded. (Punishment worked less well than rewards.) What made Skinner controversial was his insistence that all learning could be explained in terms of a *stimulus* (feature of the environment) and *response* (behavior). In today’s computer world we would say input and output, but Skinner didn’t care about internal computations any more than he cared about personal thoughts. Behavior was to be explained under the Newtonian concept of cause and effect, just as the behavior of a billiard ball can be completely explained in terms of the forces striking the ball and setting it in motion.

Chomsky’s review was truly revolutionary because it overthrew Skinner’s reign as emperor. He made several arguments—such as showing that Skinner’s use of terms like stimulus and response was too vague to be scientific—but the most important was what came to be called “the poverty of the stimulus.” Chomsky, citing Karl Lashley, said (as he himself had said in *Syntactic Structures*):

> the syntactic organization of an utterance is not something directly under the control of outside stimulation and intraverbal association, and … the syntactic organization of an utterance is not something directly represented in any simple way in the physical structure of the utterance itself.

Here we have the basic proposition of the poverty of the stimulus: **you cannot determine the rules for organizing sentences simply by studying the physical organization of sentences.** You cannot know from sentence structure alone that while you can say both *I hit the ball* and *The ball hit me*, you cannot say both *I hit the ball be threw* and *The ball hit me be threw*. If you want to say that last sentence correctly, you have to know something beyond the visible structure of the model sentences. This point is the critical one in the poverty of the stimulus argument: the rules of English and any other natural language are too “rich” to be discovered simply by studying the speech an individual encounters while learning the language.

The result of Chomsky’s revolution is apparent around us. Behaviorism ceased to be America’s dominant school of psychology. It has been replaced by a cognitive psychology that tries to explain all human behavior in terms of input, computation, and output. Chomsky’s work itself gained enormous prestige as the weapon of a giant killer and came to hold a central position in modern linguistics.

As it happens, I was never very enthusiastic about cognitivism either, because it still does not explain the literary and artistic achievements of humanity that have always been my central interests. I also quickly saw that Chomskyan linguistics too was not going to help me with those matters, and I did not pursue it. But I have always appreciated Chomsky’s role in putting a halt to Skinner’s attempt to explain literally everything in terms of the environment.
Thus, I was surprised when a commenter began insisting on the importance of operant conditioning in learning language, and I challenged him to provide a rebuttal to the poverty of the stimulus argument. To my delight, the fellow posted a long bibliography. The argument goes on.

This introductory post is already long enough, so I will put up the remainder of the analysis on following two days to consider just where we now stand and whether the idea that speech has an evolutionary history (in the biological sense) can still stand. After I’m done, the commenter will be a guest blogger and make his response.

Links:
Noam Chomsky: http://chomsky.info/
Reading list here: http://www.babelsdawn.com/babels_dawn/2009/06/motivation-and-speech.html?cid=6a00d83452ae69e2011570d8579b970c#comment-6a00d83452ae69e2011570d8579b970c
B.F. Skinner: http://webspace.ship.edu/cgboer/skinner.html
Chomsky’s Review: http://chomsky.info/articles/1967----.htm
Karl Lashley: http://academic.udayton.edu/gregelvers/hop/?m=3&a=76&key=124